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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/994,508	11/27/2001	Jae-Hak Kim	SAM-0298	1079

7590 09/26/2002
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EXAMINER

RAO, SHRINIVAS H

ART UNIT	PAPER NUMBER
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2814

DATE MAILED: 09/26/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/994,508	KIM ET AL. <i>He</i>	
	Examiner	Art Unit	
	Steven H. Rao	2814	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 July 2002.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-22 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) <u>6</u> . | 6) <input type="checkbox"/> Other: _____ |

Response to Amendment

Applicants' amendment filed on June 27, 2002 has been entered on July 20, 2002. Therefore claims 1 and 11 as amended by the amendment and claims 2-10 and 12-22 as originally recited are currently pending in the application.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Forbes et al. (U.S. Patent No. 5,926,740 herein after Forbes) and Loboda et al. (U.S. Patent No. 5,818,071, herein after Loboda) both previously applied and further in view of Townsend article (also cited by the Applicants' in their lds of January 29, 2002)

With respect to claims 1 and 11, Forbes and Laboda teach or suggest substantially all of the elements presently recited .

Presently added limitations of forming a silicon oxy carbide layer as the low dielectric interlayer insulation layer (Laboda col. 3 lines 59-col. 4 line 4, reproduced below).

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It desired for a multilayer device, one can form another layer of metal wiring on the dielectric layer and interconnect the layers by etching through the dielectric and the silicon carbide layers. FIG. 1 shows such a second metal wiring layer (7) which is interconnected with selected regions of the first layer of wiring by interconnects (6). Again, however, if the wiring is to be a high conductivity material, a layer of silicon carbide (8) should be deposited between the dielectric and the metal to prevent diffusion of the metal into the

dielectric. This silicon carbide layer can be formed as described above. In such a manner, the metal wiring is sandwiched between layers of silicon carbide. This process

The other added limitation, namely "treating the silicon oxycarbide layer with plasma after it is formed " does not patentably distinguish it over the applied Forbes and Laboda references .

Current case law states that, " As a matter of fact selection of any order of performing process steps is prima facie obvious in the absence of new or unexpected results " In re Burhaus, 154 F.2d 690, 69USPQ 330 (CCPA 1946) See also Ex p[arte Rubin 126 USPQ 440 (BAPI 1959) and In re Gibson , 39 F.2d.975, 5 USPQ 230 (CCPA 1930).

Therefore without a showing of criticality or unexpected results performing the plasma treatment before or after the formation of the silicon oxycarbide layer is prima facie obvious.

With respect to Applicants' arguments see below in response to Applicants' arguments section.

It is noted that the Townsend article cited by the applicants' in their IDS in its Abstract states : "A novel polymer has been developed for use as a thin film dielectric in the interconnect structure of high density integrated circuits."

Response to Arguments

Applicant's arguments filed 7/20/2002 have been fully considered but they are not persuasive. for the following reasons.

It is noted that Applicants' are setting out differences between individual references and their invention whereas the rejection is based on the combined teachings of both the references .

Current case law is, " In response to Applicants' piecemeal analysis of the references, it has been held that one cannot show non-obviousness by attacking references individually where, as here , the rejections are based on combinations of references. In re Keller , 208 USPQ 871 (CCPA 1981).

Applicants' contend that Forbes discloses an anti reflective coating for photolithography as opposed to the interlayer insulation layer claimed.

It is noted that the rejection is based on the combined teachings of Forbes and Laboda and Loboda in col. 3 lines 59-col. 4 line 4, reproduced above teaches use of the interlayer insulation layer as claimed

Applicants' contend that Laboda does not each or disclose forming the silicon oxycarbide layer on a substrate as a low-dielectric interlayer insulation layer and then, after formation of the silicon oxycarbide layer plasma treatment.

It is noted that the rejection is based on the combined teachings of Forbes and Laboda and Forbes in col. 8 lines 19-20 teaches forming the silicon oxycarbide layer on a substrate, Laboda in col. 3 line 59 to col. 4 lines 4 teaches the silicon oxycarbide layer as a low-dielectric interlayer insulation layer and Forbes teaches plasma treatment (see above).

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Steven H. Rao whose telephone number is (703) 3065945. The examiner can normally be reached on 8.00 to 5.00.

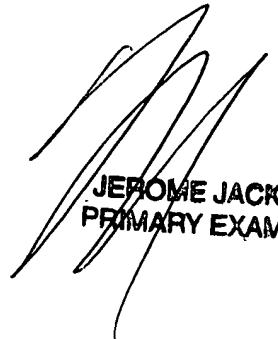
The fax phone numbers for the organization where this application or proceeding is assigned are (703) 7463926 for regular communications and (703) 872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 3067722.



Steven H. Rao
Patent Examiner

September 24, 2002



JEROME JACKSON
PRIMARY EXAMINER